Introduction

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Special Issue: Slavic Perspectives on Prosody

Zofia Malisz[a] Marzena Żygis[b]

[a]Department of Speech, Music and Hearing, KTH, Stockholm, Sweden;
[b]Centre for General Linguistics and Humboldt University, Berlin, Germany

1. Slavic Prosody

This special double-issue volume of Phonetica presents papers that analyze a wide range of prosodic phenomena: speech rhythm, timing, prominence and intonation. They cover the communicative and linguistic functions of prosody and their interaction with other domains, e.g., segmental structure, discourse functions and information structure. The focus on Slavic languages, with studies of Polish, Czech, Slovak, Russian and Bulgarian, is a small step towards correcting the relative under-representation of these languages in the recent mainstream prosodic literature. The Slavic language group is one of the three sub-families of Indo-European in Europe with a large number of speakers, the other two being the Germanic and Romance language groups. The Slavic family comprises ca. 12 official languages: Belarusian, Russian, Ukrainian, Czech, Polish, Slovak, Bosnian, Bulgarian, Croatian, Macedonian, Serbian and Slovene and their many sub-dialects, spoken by around 300 million people in geographical Europe alone (Lewis et al., 2014). Within the three sub-branches of Slavic (Eastern, Western and Southern), we find several minority and/or endangered languages, e.g., Rusyn, Kashubian, Lower and Upper Sorbian as well as transitional and insular dialects, e.g., West Polesian (Belarus-Ukraine borderlands), Resian (Italy-Slovenia), Lachian (Czechia-Slovakia-Poland) or Banat Bulgarian (Serbia-Romania) and others (Comrie and Corbett, 2003).

However, given its size, and compared to Germanic and Romance language groups, work on the prosody of Slavic has been relatively rarely reported in high-impact phonetic journals or edited collections that appear in English[1]. To illustrate the current exposure of Slavic prosody research, we provide a rough measure of the scientific output on the topic: a search was conducted (April 28, 2016) with English keywords ‘prosody’ and the name of each of the official languages in the Slavic, Romance and Germanic families

[1] International journals listed on the European Reference Index for Humanities (ERIH) specifically targeting Slavic linguistics, published mainly in English, and with frequently occurring papers on phonetics include, e.g.: Journal of Slavic Linguistics, Russian Linguistics. Other journals on Slavic published both in English and in target languages are listed, e.g. at: http://www.slavistik-portal.de/zeitschriften/zdb.html.

E-Mail karger@karger.com
www.karger.com/pho

Zofia Malisz
Department of Speech, Music and Hearing
KTH
SE–10044 Stockholm (Sweden)
E-Mail malisz@kth.se

via one of the popular search engines that harvest scientific literature. The number of hits was summed for each family: for Slavic, the estimate is ca. 56,700; for Romance, ca. 122,400; and for Germanic 218,950. This means that the output on Slavic prosody constitutes 10–15% of the sum for the three families (depending on whether or not we normalize by the number of languages in the family).

These data are an indirect consequence of political circumstances in Eastern Europe in the years 1945–1989 and possibly also of traditional divisions of labor among linguistic disciplines (Bethin, 2000). For most of the postwar period, contacts between academics were limited and the penetration of published research on Slavic linguistics on the international stage was weak. The situation was further complicated by the fact that publications were often required to appear primarily in the respective Slavic languages.

This was particularly unfortunate, since the period also witnessed many linguists and entire schools of linguistic thought in Slavic-speaking countries making great progress in phonetics and phonology (see for instance Andreeva et al. (this volume) who points to the Russian Intonation School). However, their achievements have not been as well integrated into the paradigm shifting mainstream as had been the case before the 2nd World War (Anderson, 1985).

One of the consequences of the lower research volume on Slavic phonetics, and particularly prosody, is that major gaps in its description still exist. Research on Slavic segmental phonology on the other hand has been abundant, given its historical dominance over phonetic/prosodic work among Slavic scholars since the Prague School. Segmental studies in Slavic continue to receive attention (palatalization: Kavitskaya (2006); Kochetov (2006, 2013); Ordin (2011); Mitrović (2012), voicing: Strycharczuk (2012); Ringen and Kulikov (2012); Kharlamov (2014), vowel-zero alternations, i.e., yers: Beňuš (2012); Rubach (2013) and references therein, sibilants and sibilant systems: Nowak (2006); Żygis and Padgett (2010); Pastätter and Pouplier (2013); Howson (2015)).

However, only few prosodic aspects of Slavic languages have been considered ‘classic’ and have regularly generated debates, e.g., issues in Slavic lexical stress systems (see Dogil and Williams (1999); Peperkamp et al. (2010); Newlin-Łukowicz (2012); Domahs et al. (2012) for recent work on Polish stress).

Markedly, the extensive literature on the phonology of Slavic stress and accent (see Halle (2001); Bethin (2006); Kraska-Szlenk (1995) and particularly, the review by Bethin (2000) on post-war Slavic phonology research until the millennium), stands in contrast to relatively rarer work on the acoustic correlates of prominence (lexical and phrasal stress) in Slavic languages (Crosswhite (2003) for Bulgarian, Macedonian and Polish, Malisz and Wagner (2012) for Polish, Gordeeva et al. (2003) for Russian, Duběda and Votrubec (2005) for Czech). Additionally, studies appearing in English that discuss cross-linguistic differences in global timing relations, rhythmic and prominence patterns are frequently forced to refer to few, often outdated sources or nearly empirically unattested observations regarding the particular structures in Slavic.

More attention towards Slavic languages should be warranted by results that challenged established prosodic generalizations or typologies, especially those developed primarily on the basis of Romance and Germanic data. For instance, attempts to show separation between postulated classes in rhythm taxonomies, although generally problematic (Cummins, 2002; Wiget et al., 2010; Arvaniti, 2009), have quickly demonstrated the need for re-evaluation because of Slavic data (Ramus,

2002): the languages 'fell out' of the parameter space operationalized by, e.g., rhythm metrics or failed to generalize according to trichotomous categories of mora, stress and syllable-timed (see Dankovičová and Dellwo (2007) for Czech, Beňuš and Šimko (2012) for Slovak, Malisz (2013); Wagner (2014); Gibbon et al. (2014) for Polish, Barry et al. (2003) for Bulgarian).

Bethin (2000) noted in her overview of Slavic studies in the U.S. that major paradigm shifts in prosodic phonology, such as the widespread move to autosegmental-metrical models, have happened without the wider involvement of Slavists. Intonational phonology description systems (ToBI or alternatives) have since been suggested for Slavic languages (Odé (2003); Rathcke (2009, 2013) for Russian, Rusko et al. (2007) for Slovak, Godjevac (2000a, b, 2005) and Smiljanić (2013) for Serbian and Croatian, Wagner (2008) for Polish). However, consolidated or comparative follow-up discussions to these endeavors have not yet taken place.

It is, therefore, not surprising that data from Slavic often sit squarely with mainstream intonation models. The present issue provides an opportunity to re-evaluate the models in light of, for instance, the especially rich linguistic means of expressing information structure in Slavic (Jasinskaja, 2013). Within the Slavic family, we find a lot of differences in how intonation contours in yes/no questions are realized, a degree of variation that is seldom found among the languages in the Germanic family (Sawicka, 2001; Andreeva et al., 2015). Deaccentuation (Cruttenden, 2006) under focus in Slavic also appears to deviate from the regular pattern found in Germanic. One of the most distinctive characteristics of Slavic languages is the free word order which has profound consequences on the syntax-prosody interface (Comrie and Corbett, 2003).

Nonetheless, while some of the major Slavic languages have been described with regards to prosody and information structure (Andreeva and Oliver (2005); Andreeva et al. (2012) for Bulgarian and Polish), others, especially those with a small number of speakers, have no available descriptions at all (Jasinskaja (2013) mentions Slovene and Sorbian). Similarly, research on the functions of prosody in discourse needs more investigation (Karpiński, 2012).

Meanwhile, mainstream research on prosody has been developing strongly in the exploration of segment-prosody interfaces (e.g., issues in *Phonetica* edited by Kohler (2012) and in the *Journal of Phonetics* by Mücke et al. (2014)). Evidence recently gained from laboratory phonological research on Slavic languages provided crucial insights into the ways in which prominence and the edges of prosodic constituents influence segmental attributes and conversely, how prosodic properties are contingent upon segmental properties (Iskarous and Kavitskaya, 2010; Malisz et al., 2013; Duběda and Keller, 2005; Pouplier and Beňuš, 2011; Żygis et al., 2014).

Given the status of Slavic prosody studies, the present issue aims to help relieve some of the urgent needs in the description of prosodic phenomena in Slavic, update the state of modeling, and provide a wider linguistic context for an unbiased discussion of the established models in our discipline.

2. The Special Issue

To strengthen the position of research on Slavic prosody in modern phonetics, the issue concentrates on bringing those phenomena in Slavic to closer attention that are currently considered crucial in solving critical prosodic problems. Similarly,

focus is on studies that use up-to-date and established descriptive methodologies and theoretical frameworks enabling the following: comparison of results on Slavic with other languages, extension of existing theories and models to Slavic material, revision of theoretical generalizations and evaluation of the validity of established methods.

The papers are gathered into two sub-topics in the present volume: 'Slavic Prosody' and 'Interfaces in Slavic Prosody', teasing apart work focusing on purely prosodic phenomena and that in which the explanations are based on links to other linguistic representations and areas. Thus, the first sub-topic includes papers which predominantly deal with fundamental problems in Slavic prosody, i.e., timing phenomena, acoustic correlates of prominence, rhythm and intonation (Beňuš and Šimko; Rathcke; Malisz et al.). The second sub-topic encompasses studies which link prosody with other linguistic areas, such as information structure, syntax and pragmatics (Andreeva et al.; Luchkina and Cole; Volín et al.; Arvaniti et al.).

Beňuš and Šimko employ Lombard speech to uncover the phonetic mechanisms of boundary strengthening. By pushing the realization of prosodic boundaries and prominence in Slovak to their limits, they find that realized *f0*, duration and articulatory patterns are not simply accumulative but reveal complementary synergistic effects based on affordances in noise-unperturbed speech. Although Beňuš and Šimko do not commit to any theory or model in this work, the methodological paradigm harks back to perturbation studies revealing coordination dynamics of complex systems (Kelso and Tuller, 1983), in this case, the dynamics of prosodic patterning.

Languages follow one of two strategies when the timing and voicing of segments structurally constrain the production of pitch accents: the intended pitch contour can be entirely produced in a limited time period and compressed or it can be incompletely realized by undershooting the target and truncating *f0* (Erikson and Alstermark, 1972; Grabe, 1998). **Rathcke** re-analyzes truncation in two typologically different languages, Russian and German and questions the classification of languages as either compressing or truncating (Ladd, 2008) by showing that a given language can follow both strategies. She also proposes a more comprehensive model of tonal adjustment for Russian and German.

Malisz, O'Dell, Nieminen and Wagner propose a dynamic model, the coupled oscillator model (O'Dell and Nieminen, 2009) in the current debate concerning the mechanisms behind speech timing and rhythm. They then explore the coupling of the syllabic oscillator with supra-syllabic oscillators in two typologically different languages, one Slavic (Polish) and one Finno-Ugric (Finnish). They suggest that language specific prosodic constraints determine the identity of the supra-syllabic cycle: the phonological word is more relevant in Polish than in Finnish. Also, they show that the mutual influences between the oscillators change dramatically under different speech rate conditions in Polish but not in Finnish.

Regarding information structure, **Andreeva, Koreman and Barry** show that Bulgarian speakers consistently differentiate broad and narrow focus by means of both local cues, i.e., those encoded in the nuclear-accented syllables, and global acoustic cues, i.e., those reflecting broader phonetic patterns in the intervals before and after the nuclear-accented syllable. Their results indicate that speakers produce different pitch accent types on the nuclear syllable and reduce the 'phonetic strength' of the default pre-nuclear accent in the narrow focus condition. The acoustic properties of the nuclear and pre-nuclear accented syllables are less pronounced in

the broad focus condition and considerably more strongly manifested in the narrow focus condition.

The paper by **Luchkina and Cole** examines structural and referent-based effects in terms of acoustic cues in Russian. While the former effects refer to the particular linearization of words in a sentence, the latter include the semantic and pragmatic effects of the discourse referent of a word, and grammatical roles that are partially dependent on referent characteristics. The results indicate prosodic augmentation in terms of increased F0, intensity and duration due to both structural effects, i.e., words positioned ex-situ, and referent-based effects, i.e., words that are grammatical subjects with animate referents. In addition, it is shown that discourse-given and discourse-new information is prosodically more augmented than inferable information.

Studies in this issue also show how established acoustic parameters co-vary to cue communicative functions in discourse (Volín et al.; Arvaniti et al.) and information structure (Andreeva et al.). **Volín, Weingartová and Niebuhr** offer an in-depth examination of the prosodic forms that express different pragmatic functions of the Czech discourse marker 'jasně', including resignation, reassurance, surprise, indifference or impatience. Their results point to multi-parametric differences between the 'jasně' realizations in terms of their F0, timing and intensity patterns, which give rise to generally consistent form-function mappings when submitted to a clustering analysis.

Finally, **Arvaniti, Żygis and Jaskuła** examine the intonation of calling in Polish under pragmatic circumstances which lead to two distinct melodies that the authors call 'urgent' and 'routine'. They provide an autosegmental-metrical (AM) analysis for these melodies based on both F0 and other differences, and focus their analysis within a broader consideration of the intonation system of Polish. The authors also address the issue of modeling these melodies in AM, which assumes underspecification in intonation, and the Parallel Encoding and Target Approximation (PENTA, e.g. Xu et al., 2015), which predicts a syllable-by-syllable specification for F0; they show that while AM can adequately model the attested Polish contours even under extreme tonal crowding, this is not possible in PENTA, as full F0 specification does not provide the requisite flexibility (Arvaniti and Ladd, 2009, 2015; Xu et al., 2015).

In almost all papers dealing with intonation, authors either explicitly emphasize or implicitly assume that intonation is not only expressed by the fundamental frequency but is also simultaneously cued by amplitude, duration and spectral properties (Arvaniti et al.; Luchkina and Cole). Similarly, Beňuš and Šimko, who investigate how increasing the level of ambient noise affects the realization of Slovak prosodic boundaries, conclude that all cues, including some articulatory parameters, 'co-create complex prosodic patterns in a complementary and synergetic manner'. Andreeva et al. address the question of how different types of focus in Bulgarian (broad vs. narrow, non-contrastive and contrastive) are acoustically distinguished and defined by means of pitch, duration and intensity variation.

The authors of the special issue highlight the importance of a more structurally complex point of view on the phenomena by describing several levels of relationships between the prosodic units narrowing and widening the scope of analysis. Andreeva et al. describe local lengthening under paradigmatic focus in Bulgarian but also the relative syntagmatic suppression of prominence in the pre-nuclear syllables leading to increased salience of the accented material in narrow focus. Similarly, Beňuš and Šimko study the phonetic adjustments speakers make in adverse conditions on several

boundary levels and also examine the relationships of prominence (pitch accents) and boundary cues. Luchkina and Cole exploit the fact that Russian is characterized by free word order to investigate syntagmatic prosodic relations in whole utterances.

Analyses of both laboratory and quasi-spontaneous speech material are included, especially studies that combine both corpus-analytic and experimental methods. Such diversity is welcome given a current debate on the impact of stylistic diversity in phonetic and phonological research (Wagner et al., 2015) vs. advantages of using controlled data (Xu, 2010). The results presented in the special issue are based on analyses of strictly controlled data (Andreeva et al.; Arvaniti et al.; Beňuš and Šimko; Rathcke), quasi-spontaneous speech data based on scripted dialogues (Volín et al.) and read speech (Malisz et al.; Luchkina and Cole).

Finally, it is also notable that in the majority of studies in this issue much emphasis has been put on inter-speaker variation, its potential sources and consequences for the analysis.

We believe that this collection of studies on Slavic prosody provides a platform for some of the current, high quality phonetic research on Slavic prosody and serves as a valuable reference for future investigations. Our hope is also that a renewed interest in Slavic prosodic systems will be beneficial in drawing more attention not only to the major languages but also to lesser known and minority languages and dialects in Slavic that definitely deserve more scientific attention.

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